

**REMARKS**

**Specification**

\_\_\_\_\_ By the Office Action dated October 5, 2010, the Examiner has objected to the Specification. (See Office Action, page 2, paragraph 3 and page 3, paragraph 1.) Applicants have amended the Specification accordingly. Specifically, Applicants have amended the Specification to include the material incorporated by reference in U.S. Provisional Application Serial No. 60/555,590, to which the Application claims priority. Applicants respectfully submit that no new matter has been added by the amendment to the Specification. Applicants respectfully submit that the Specification, as amended, complies with the requirements of the MPEP and 37 CFR.

**Claims**

By the Office Action dated October 5, 2010, the Examiner has objected to the claims 32 and 33. Applicants have amended claim 33 accordingly. Applicants respectfully submit that claims 32 and 33, as amended, comply with the requirements of the MPEP and 37 CFR.

**35 U.S.C. § 112 Claim Rejections**

By the Office Action dated October 5, 2010, the Examiner has rejected one or more claims of the Application for lacking “adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112.” (See Office Action, page 2, paragraph 3.) The Specification has been amended in order to provide such support and enablement for the claims, especially for claims 1-6, 13, and 21-33. Applicants respectfully submit that no new matter has been added by the amendment to the Specification. Applicants respectfully submit that claims, especially claims 1-6, 13, and 21-33, comply with 35 U.S.C. § 112.

By the Office Action dated October 5, 2010, the Examiner has also rejected claims 1 and 21 “under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.” (See Office Action, page 4, paragraph 1.) Claims 1 and 21 have been amended for clarification purposes only. Applicants respectfully submit that no new matter has been added by the amendment to claims 1 and 21.

Applicants respectfully point to MPEP 2173.05(i) which reads in pertinent part, “The current view of the courts is that there is nothing inherently ambiguous or uncertain about a negative limitation. . . . The mere absence of a positive recitation is not basis for an exclusion. . . . **Note that a lack of literal basis in the specification for a negative limitation may not be sufficient to establish a *prima facie* case for lack of descriptive support**” (emphasis added).

Applicants have gone above and beyond the requirement of MPEP 2173.05(i) since they have actually included literal support in the written description, even though not required to do so under MPEP 2173.05(i). As a non-limiting example, on page 7 of the specification Applicants describe (emphasis added),

It is understood that in accordance with this invention the shell of the hollow nanocrystals **form a continuous three dimensional domain adopting a three dimensional arrangement of atoms in contrast to molecular sheets** such as found in graphitic, WS<sub>2</sub> or MoS<sub>2</sub> nanotubes and nanocages.

The crystallinity of the hollow nanocrystal wall, or shell is controllable. In a preferred embodiment the shell is at least **partially crystalline**. The advantage of a **polycrystalline shell** is that the defective grain boundary will allow gasses and other chemical species made of small molecules to permeate. One skilled in the art will appreciate that annealing at relatively high temperatures will eliminate many grain boundaries. In one embodiment of the present invention the hollow nanocrystals have an extremely low crystallinity, so as to be almost amorphous. **The hollow nanocrystals in the present invention are not perfectly single crystalline.**

On page 14 of the specification, Applicants also describe (emphasis added),

...various carbon nanostructures, including diamond nanoparticles or carbon nanotubes may be utilized as the starting material and reacted with other species to obtain carbon-alloyed hollow nanostructures, for example hollow nanospheres of steel may be synthesized by reacting a diamond nanospheres with a suitable iron source. This resulting structure will be **chemically and crystallographically very different from sheet-like structures** such as buckminsterfullerenes or carbon nanotubes.

One skilled in the art will understand that these descriptions in the specification refer to the term and provide support for the term “not comprised of discrete molecular sheets” as written in the claims. Thus, since Applicants have gone above and beyond the requirement of MPEP 2173.05(i), Applicants respectfully request that the rejection be withdrawn. Applicants respectfully submit that claims 1 and 21, as amended, comply with 35 U.S.C. § 112.

### **35 U.S.C. § 102 Claim Rejections**

#### **Claims 1–3**

By the Office Action dated October 5, 2010, the Examiner has rejected claims 1-3 under 35 U.S.C. § 102(b) as being anticipated by Carauso et al. (hereinafter “Caruso”). Claims 1-3 were rejected under 35 USC 102(e) for allegedly being anticipated by Caruso et al. In response to the Office Action of 4/23/10, Applicants respectfully pointed out that the claimed characteristic “not comprised of discrete molecular sheets” of Applicants’ invention renders it patentably distinct from Caruso’s et al disclosure. On page 6 of the Office Action of 10/5/10, 1<sup>st</sup> full paragraph, the Office alleges “Applicant has not provided evidence that Caruso's et al reference actually states such a thing, but rather infers based on the teaching.” It is Applicants’ understanding that the Office’s statement above is directed to the fact that Applicants’ claimed invention is not comprised of discrete molecular sheets, and that the Office asserts Caruso’s et al disclosure is also not comprised of discrete molecular sheets, which is causing the alleged anticipation of Applicants’ invention.

Applicants respectfully disagree and point to MPEP 2112.01, section I, 2<sup>nd</sup> column, which notes that when the Office contends that a claim has been allegedly anticipated by a reference, this “can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product.”

Applicants respectfully disagree that Caruso et al is prior art. However, to address the Office's rejection, Applicants respectfully note that Caruso et al teach, on page 1111, columns 2 and 3, "Composite **multilayers**... [and] silicate **sheets**...have been constructed using the LbL approach.... Here we report on the fabrication of hollow inorganic silica and inorganic-hybrid spheres through the colloid templated electrostatic LbL self-assembly of silica nanoparticle (SiO<sub>2</sub>)–polymer **multilayers**" (emphasis added).

As another of many such examples, Caruso et al teach on page 1111, column 3, "The versatility of the process in forming composite **multilayers** is demonstrated by the control that can be exerted over the number of deposition cycles, allowing **regular uniform multilayers** to be formed" (emphasis added).

Doubtless one skilled in the art will observe that Caruso's et al disclosure is not necessarily "not comprised of discrete molecular sheets." Rather it is the contrary. Caruso et al state numerous times that their disclosure is indeed comprised of "regular uniform multilayers" and "silicate sheets" (Caruso, 1111). Applicants' invention is "not comprised of discrete molecular sheets," unlike Caruso's et al disclosure, therefore Caruso et al do not teach each and every aspect of Applicants' invention and Applicants respectfully request the rejection be withdrawn.

### **Claims 1–32**

By the Office Action dated October 5, 2010, the Examiner has rejected claims 1-33 under 35 U.S.C. § 102(e) as being anticipated by Chow (U.S. Patent Application Publication No. 2006/0279905 (hereinafter "Chow"). Claims 1-32 were rejected under 35 USC 102(e) for allegedly being anticipated by Chow '905. The Office Action of 10/5/10 alleges Chow '905 discloses "a hollow nanocrystal (i.e. nanofibers) comprising a nanocrystal shell having a

thickness and diameter dimensions that falls within a .5 nm and 100 nm range, and lacking a core while not being comprised of discrete molecular sheets and having a shape that may be spherical, disk, or branch shaped.”

Applicants respectfully point out that Chow ‘905 never recites Applicants’ claimed invention of a nanocrystal **that is not comprised of discrete molecular sheets**. Since nowhere does Chow ‘905 recite this element of Applicants’ claimed invention, Chow ‘905 does not teach each and every element of Applicants’ claims.

Furthermore, the focus of Chow ‘905 is a capacitor which happens to use, what Chow ‘905 describes as, “nanofibers.” Chow ‘905 does not, however, ever attempt to claim its “nanofibers” and only vaguely defines them as a “nanostructure typically characterized by at least one physical dimension less than about 1000 nm . . . ” (Chow ‘905, section 0056). One skilled in the art will readily understand that this is a mere blanket definition designed to be a placeholder, not an accurate description of any type of prior art. A statement so broad as to encompass nearly any structure less than 1000 nm without any further meaningful disclosure is essentially a recitation of a dictionary definition of natural phenomena.

Even if Chow ‘905 taught each and every element of Applicants’ claims, which Applicants believe it does not, the description would not enable one skilled in the art to practice the disclosure without undue experimentation, and MPEP 2121, section II, states “The level of disclosure required within a reference to make it an ‘enabling disclosure’ is the same **no matter what type of prior art is at issue**. It does not matter whether the prior art reference is a U.S. patent, foreign patent, a **printed publication or other**” (emphasis added). MPEP 2121.01 further states “**mere naming or description of the subject matter is insufficient**, if it cannot be produced without undue experimentation” (emphasis added). Thus since Chow ‘905 would not

enable one skilled in the art to practice the “nanofiber” without undue experimentation, it should not be used as a reference.

On page 5 of the Office Action of 10/5/10, the Action alleges that Chow ‘905 anticipates Applicants’ method of making hollow nanocrystals (Chow ‘905, sections 0086-0089). However, Chow ‘905 itself never recites any such method; rather it lists numerous citations to other references only. According to MPEP 2131, “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, **in a single prior art reference**” (emphasis added). Since Chow ‘905 does not by itself teach each and every element of Applicants’ claimed invention, Applicants respectfully request the rejection be withdrawn.

### **Conclusion**

It is therefore clear that claims 1-33 comply with the requirements of 35 U.S.C. §§ 102, 103, and 112. The application is therefore in condition for allowance. Early notification to that effect is respectfully solicited. In the event that any issue remains unresolved, the Examiner is invited to telephone the undersigned at 510-486-6503.

A petition for a two-month extension of time is hereby attached and requested. The Office is authorized to deduct \$245.00 from Deposit Account No. 120690. Please charge any necessary and additional fees that may be due to Deposit Account No. 120690. If any fee is required to maintain pendency of this application, the Commissioner is authorized to charge any necessary and additional fees, including fees for additional extensions of time, that may be due to Deposit Account No. 120690, referencing Attorney Docket: IB-2012.

Respectfully Submitted,

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